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Appn. No. 10/807,088

Attorney Docket No. 10543-069

**I. Amendments to the Claims**

1. (Currently Amended) A system for estimating body states of a vehicle comprising:

a first linear accelerometer and a second linear accelerometer set of at least two sensors mounted to the vehicle in separate locations, the first and second linear accelerometers set of sensors generating measured vehicle state signals corresponding to the acceleration of the vehicle in a first direction;

a second set of at least two sensors third linear accelerometer and a fourth linear accelerometer mounted to the vehicle in separate locations, the second set of third and fourth linear accelerometers sensors generating measured state signals corresponding to the acceleration of the vehicle in a second direction;

a signal adjuster which transforms the measured vehicle states signals from a sensor coordinate system to a body coordinate system associated with the vehicle; and

a filter which receives the transformed measured signals from the signal adjuster and processes the measured signals into body state estimates of the vehicle, the body state estimates include at least of one a roll rate, a roll angle and a yaw rate.

2. (Currently Amended) The system of claim 1 wherein the filter includes a model of the vehicle dynamics and a model of the sensors linear accelerometers, the state estimates being based on the transformed measured



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signals and the models of the vehicle dynamics and ~~sensors~~ linear accelerometers.

3. (Currently Amended) The system of claim 1 wherein the filter includes an estimator, an algorithm being implemented in the estimator to process the transformed measured signals and the models of the vehicle dynamics and ~~sensors~~ linear accelerometers and generate the state estimates.

4. (Cancelled)

5. (Currently Amended) The system of claim 1 further comprising ~~wherein one of the sensors is an angular rate sensor~~.

6. (Cancelled)

7. (Currently Amended) The system of claim 1 further comprising ~~wherein the sensors further include two~~ linear accelerometers that measure accelerations in a third direction.

8. (Cancelled)



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9. (Currently Amended) The system of claim 1 further comprising ~~wherein the sensors include two linear accelerometers that measure the vertical accelerations of the vehicle.~~

10. (Original) The system of claim 1 wherein the state estimates relate to the vehicle's lateral velocity, yaw rate, roll angle, and roll rate.

11. (Currently Amended) The system of claim 1 wherein the signal adjuster further provides compensation for gravity biases associated with the ~~sensors~~ linear accelerometers.

12. (Currently Amended) A method for estimating body states of a vehicle comprising:

generating measured vehicle state signals corresponding to the acceleration of the vehicle in a first direction with a first linear accelerometer and a second linear accelerometer set of at least two sensors;

generating measured vehicle state signals corresponding to the acceleration of the vehicle in a second direction with a third linear accelerometer and a fourth linear accelerometer second set of at least two sensors;

transforming the measured vehicle states signals from a sensor coordinate system to a body coordinate system associated with the vehicle; and



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processing the measured signals into body state estimates of the vehicle, the body state estimates include at least of one a roll rate, a roll angle and a yaw rate.

13. (Currently Amended) The method of claim 12 system of claim 1 wherein the processing includes modeling the vehicle dynamics and the sensors linear accelerometers.

14. (Cancelled)

15. (Cancelled)

16. (Original) The method of claim 12 wherein the state estimates relate to the vehicle's lateral velocity, yaw rate, roll angle, and roll rate.

17. (Currently Amended) The method of claim 12 wherein the transforming includes providing compensation for gravity biases associated with the sensors linear accelerometers.



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